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Development of Superconductive Magnets

The paper submitted is a brief discourse on the development of superconductive magnets. The following topics are included: 1) Problems encountered, particularly in stabilization, 2) Progress made toward solution of problems encountered, 3) Advances in materials and their uses; for instance, niobium stannide, niobium zirconium, and niobium titanium conductors, 4) Evolution in design during the past decade. Descriptions of particular magnets that illustrate the progress made are included.

Field strengths have increased from 1.5 tesla to 15.0 tesla, and bore sizes from a fraction of a centimeter to about 5 meters. Present research problems noted are: low current density in the windings compared to the current density in the conductors; and large size and weight of the magnets.

Superconductive magnets will be needed for magneto-hydrodynamic and thermonuclear power generation

when these become realities. Such magnets are already being used in atomic particle accelerators as bending and focusing magnets, and in bubble chambers. The use of magnets for levitation, for items ranging from trains to plasma physics devices, is being studied.

Note:

Requests for further information may be directed to:
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Patent status:

No patent action is contemplated by NASA.

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